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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/586,530	05/31/2000	Tuqiang Ni	LAM2P282	6020
25920	7590	05/17/2004	EXAMINER	
MARTINE & PENILLA, LLP 710 LAKEWAY DRIVE SUITE 170 SUNNYVALE, CA 94085			SONG, MATTHEW J	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 05/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/586,530

Applicant(s)

NI ET AL.

Examiner

Matthew J Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1 and 8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 recites, "directly radiant energy at two or more wavelengths directly onto a layer" in line 4. There is no support in the instant specification for "directly". The instant specification merely teaches directing radiant energy. Furthermore, the instant specification teaches a light source 26 and the light from this source is supplied to a bundle, then onto the wafer, which teaches away from "directly" because the light is supplied directly from the light source. Likewise for claim 8.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

4. Claims 1 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as

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the invention. Claim 1 recites, "directly radiant energy at two or more wavelengths directly onto a layer" in line 4. It is unclear what "directly" means. The instant specification teaches a light source 26 and the light from this source is supplied to a bundle, then onto the wafer, which teaches away from "directly" because the light is supplied directly from the light source.

Likewise for claim 8.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4, 6-11, and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Litvak (US 5,499,733).

In regard to claims 1 and 6-7, Litvak discloses a method for determining an etchpoint comprising: directing radiant energy at two or more wavelengths onto the layer to be etched (col 8, ln 18-20); and detecting the endpoint based on an analysis of signals emitted vs. wavelength (col 12, ln 45-67). Litvak also discloses the changing thickness may be monitored in cases where it is not intended to completely remove it anywhere (col 11, ln 8-25), this reads on applicant's main etch, which is defined by applicant of page 7 of the instant application, as a point at which a small amount of polysilicon remains unremoved. Litvak also discloses it is usual to detect endpoint by reflecting radiation directly off the exposed layer being processed and thus avoid

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passing through the substrate and the front side of the structure may be illuminated by the beam (col 3, ln 55 to col 4, ln 5 and col 13, ln 5-20), this reads on applicants' directing radiant energy directly onto a layer to be etched. Litvak also discloses a beam of light having a finite bandwidth is directed against a layer and a light signal reflected from the layer is then detected. Litvak also discloses the detected intensity of the reflected light cycles between one or more maxima and minima as the material removal layers the relative phase between the two interfering beams. Litvak also discloses a first beam of electromagnetic radiation, a second beam of electromagnetic radiation and monitoring a varying intensity of the second beam (claim 1). Litvak discloses using a broad-spectrum radiation source, which comprises many different wavelengths (col 12, ln 60-67 and Fig 14A and 14B), this reads on applicants' radiant energy at three or more wavelengths. Litvak discloses measuring the maximum intensity of the reflected light rays until a breakthrough of the layers using photodetectors (col 8, ln 15-30), this reads on applicants' detecting a last intensity maximum reflected from the layer at a first wavelength prior to the selected etch endpoint and detecting an intensity maximum reflected at a second wavelength first occurring after the last intensity maximum at the first wavelength wherein the intensity maximum reflected at the second maximum occurs before breakthrough to an underlying material because the intensity maximums of both light beams are detected by the photodetector throughout the etching process, which includes prior to and after breakthrough.

In regard to claim 2, Litvak discloses two light beams, which inherently have two different wavelengths because reflected light beams penetrate differently into the layer 203; therefore one light beam inherently has a larger wavelength than the second light beam.

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In regard to claim 3, Litvak discloses that at least two interference maxima occur (col 8, ln 19-20 and Fig 7).

In regard to claim 4, Litvak discloses the use of transparent materials (col 7, ln 48-50).

In regard to claims 8-11 and 13-14, these claims differ from claims 1-4 and 6-7 above by utilizing three or more wavelengths. Litvak discloses a process where various wavelengths are detected (col 12, ln 63-64), which reads on applicant's "three or more".

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Litvak (US 5,499,733) in view of Applicants' Admitted Prior Art (Admission).

Litvak discloses all of the limitations of claim 5, as discussed previously, except the layer comprises a polysilicon material. Litvak does disclose using a transparent material.

Admission teaches etching transparent materials such as silicon dioxide or partially transparent materials such as polysilicon. It would have been obvious to a person of ordinary skill at the time of the invention to modify Litvak by using a transparent material, such as polysilicon, as taught by Admission because selection of known materials based on its suitability for intended use is held to be obvious (MPEP 2144.07).

Response to Arguments

9. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's arguments filed 3/1/2004 have been fully considered but they are not persuasive.

Applicants' argument that Litvak teaches the light is directed through the substrate and does not teach directing radiant energy directly onto the layer is noted but is not found persuasive. Litvak does teach supplying radiant energy through the substrate, as suggested by applicants, however portions of Litvak cited by Applicants' merely suggest a preferred embodiment. Litvak does teach the process may be used when the radiation is directly applied to the exposed layer. Litvak teaches the endpoint can be detected from the complicated reflected radiation signal from directly the radiation directly off the exposed layer (col 3, ln 55 to col 4, ln 5). Litvak also teaches process may be preformed from the front side of the wafer instead of the backside (col 13, ln 1-20).

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In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the importance of this sequence of maximums (pg 8)) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants' argument that Litvak does not teach the detecting the sequence of maximums is noted but is not found persuasive. Litvak teaches measuring the maximum signal from two or more light beams throughout an etching process, which includes prior to and after breakthrough (col 2, ln 1-5 and col 8, ln 15-30); therefore Litvak does teach detecting the maximums of two or more wavelengths and the maximums inherently are detected in sequence because the wavelengths are different.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song
Examiner
Art Unit 1765

MJS

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

